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AUTHOR Jonker, Vera M.; Heim, Margriet J. M.
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ABSTRACT

The Communicative Development of Toddlers with Cerebral Palsy (COCP) project developed an assessment-intervention program for non-speaking children with cerebral palsy. The goals of the project's Assessment-Intervention protocol are to teach the child to communicate in an appropriate, effective, and efficient way in different situations and with different communication partners, and to teach communication partners to stimulate the communicative behavior of the child, in particular by adapting their own behavior to the communicative needs of the child and by modeling the use of communication aids. The program is aimed at different communication partners, including parents, other important adults in the home environment, those responsible for the child's transport, teachers and teachers' assistants, and therapists. Use of the protocol involves gathering background information, conducting a formal assessment, describing communicative behaviors of both adult and child, setting goals, developing an intervention plan, implementing the intervention, and conducting an evaluation. A case study illustrates use of the protocol. Three figures are included. An appendix lists 10 strategies to facilitate communicative interaction. (JDD)

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A COMMUNICATION PROGRAM FOR NONSPEAKING CHILDREN AND THEIR PARTNERS

Paper presented at the Fifths Biennial International ISAAC Conference
on Augmentative and Alternative Communication
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Vera M. Jonker & Margriet J.M. Heim,
Institute of General Linguistics
University of Amsterdam
Spuistraat 210
1012 VT Amsterdam
The Netherlands
Phone +31.20.5253851
Fax +31.20.5253052
Email heim@alf.let.uva.nl

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1 Introduction

The ultimate goal of a communication intervention program should be to promote functional communication which is suitable in all kinds of environments. From previous studies of nonspeaking cerebral palsy children it has emerged that the communication between these nonspeaking children and their speaking partners falls short in many ways. For instance the speaking adult is dominant in the interaction: the children rarely introduce topics in the conversation and they take fewer turns. Furthermore the children use their communication aids infrequently and in a limited way, apparently related to the modelling provided by the adult. It is the behaviour of the speaking partners which seems to restrict the communicative possibilities of the children instead of stimulating them. In fact, different adult behaviours produce different results. Heim (1989, 1990) found that the children contribute more to the communication if the adults paused more frequently and for longer, if they asked fewer questions and talked less. These effects highlight the need for changing adult communicative behaviour, that is facilitator-training.
With this aim the COCP Project started in 1990. COCP stands for 'Communicative Development of Toddlers with Cerebral Palsy'. In the project an assessment-intervention program is being developed, based on research and knowledge about normal language acquisition and about the target group, non-speaking Cerebral Palsy children. In this paper the focus will be on the content of the program: the aspects we consider new and challenging will be presented, followed by a case illustration. [1]

2 The COCP Assessment-Intervention Protocol

The COCP Assessment-Intervention Protocol has developed out of the approach advocated by the Hugh MacMillan Rehabilitation Centre in Toronto since the eighties (Light et al, 1986). Relatively new in this approach is the clear emphasis on facilitator involvement in the assessment and intervention process.
The goals of the COCP Assessment-Intervention Protocol are two-fold:

- that the children learn to communicate in an appropriate, effective and efficient way in different situations and with different communication partners.
- that the communication partners learn to stimulate the communicative behaviour of the children, in particular by adapting their own behaviour to the communicative needs of the child and by modelling the use of communication aids.

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[1] As a part of the COCP-project the effects of the assessment-intervention program are being studied longitudinally with three children. The final results of this research will be available in 1994. Please contact the authors for more information about the research part of the project.

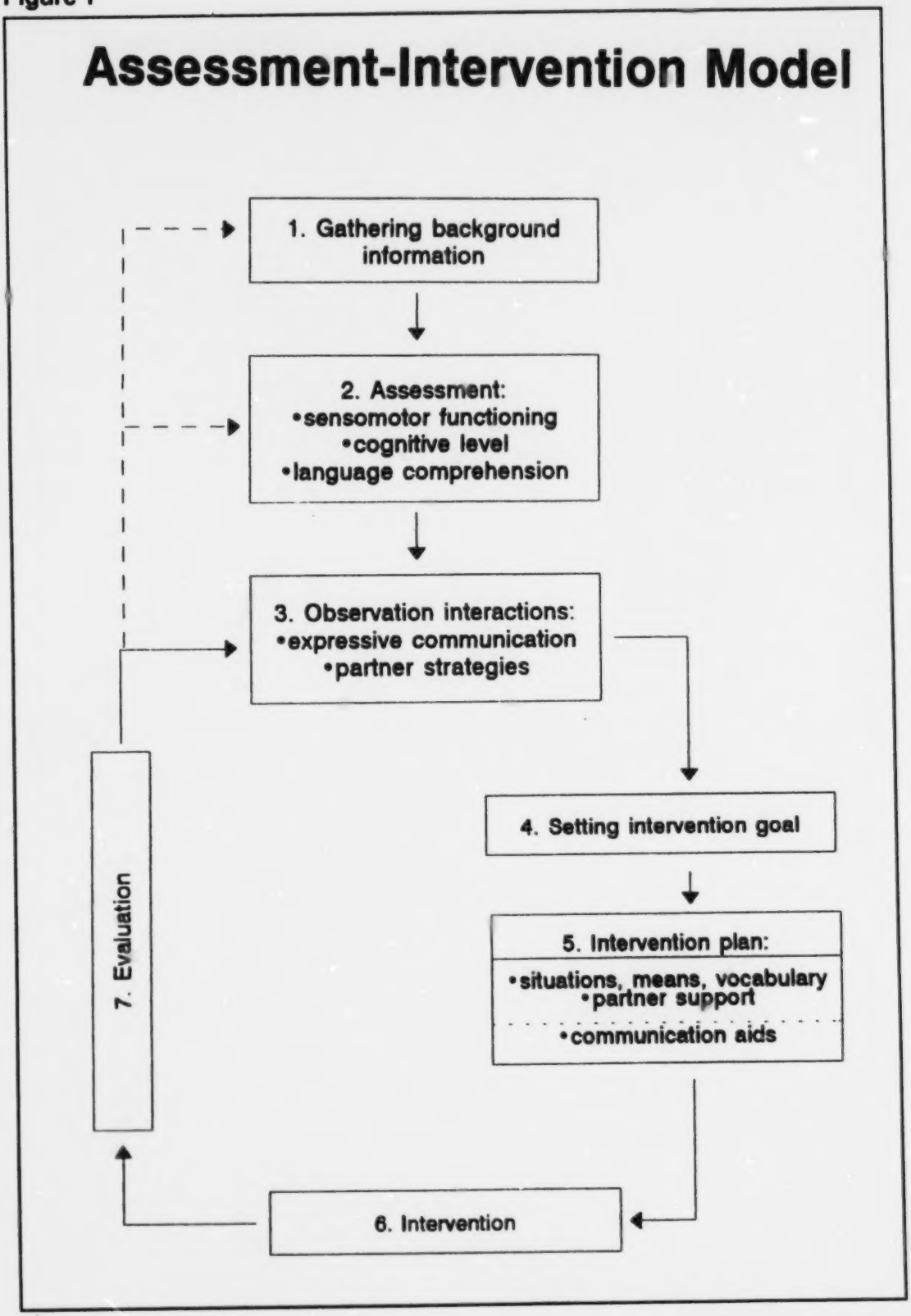
The program is directly aimed at the most important facilitators, the different communication partners, that is:

- parents,
- other important adults in the home environment (such as relatives, friends, baby-sitters),
- those responsible for the child's transport such as taxi drivers,
- teachers and teachers' assistants,
- and therapists.

Under the term *different situations* we understand all the situations occurring during a normal day, for instance dinner time, going shopping or having physiotherapy.
The specific training worked out for the facilitators around each child is based on an assessment-intervention model which will be presented in detail. The specific training for the communication partners is an implementation of general facilitating strategies which we have drawn from the literature and previous research. These are set out in the Appendix.

The profile of the assessment-intervention model is presented in Figure 1. To begin with, one has to gather background information. Of course you have to know about the medical history and diagnosis of the child. But of even greater importance is establishing what the interaction environment of the child is and who the most important communication partners are for the particular child. The communication partners are an important source of information about the child's communicative functioning in different environments. This information we collect through a standardized questionnaire which focuses on the functions and modes the child uses.
The second step is formal assessment. For communication assessment one needs information about sensorimotor functioning, cognitive level and language production and comprehension.
Then one has to observe interactions to describe the communicative behaviours of both adult and child. In the child the range and frequency of functions and modes already used are described. Examples of functions are: *attention to the partner, turn taking within an activity* or *request for an object or action*. The modes distinguished here are: eye-gaze, vocalisation, speech, facial expression, reaching/pointing, gestures/signs, photographs, pictures and graphic symbols. In the adult the interaction strategies must be evaluated.
The information on the communicative functions and modes, gathered from the questionnaires and observations, is summarized and forms the basis for the fourth step: the setting of goals. The entire intervention group, that is all communication partners and the AAC-specialists, discuss the assessment results and identify intervention goals. By setting goals together, the aim is to achieve a more integrated approach across the facilitators and across the different communication situations.
On the basis of goals the intervention plan is made. It is determined where opportunities naturally occur for the child to learn to express the targeted communicative function in the selected modes. And general facilitating strategies for the facilitators are worked out into concrete steps to support the targeted functions.

Figure 1


Assessment-Intervention Model
1. Gathering background information
2. Assessment:
•sensomotor functioning
•cognitive level
•language comprehension
3. Observation interactions:
•expressive communication
•partner strategies
4. Setting intervention goal
5. Intervention plan:
•situations, means, vocabulary
•partner support
•communication aids
6. Intervention
7. Evaluation

With the plan intervention can now take place. All facilitators try to encourage the child to participate in communicative interaction effectively and to express the targeted communicative function. Facilitators are given help and instruction on a regular basis either individually or in group meetings. For the individual sessions a video recording is made and analyzed with the particular facilitator.
The seventh step (see Figure 1) includes evaluation. During each training session with the facilitators the intervention plan is evaluated and necessary changes are made.
At six-month intervals the assessment steps are repeated: from stage one the questionnaire is repeated, from stage two language comprehension and from stage three all aspects.

3 The case study: Yvette

At the beginning of our intervention program Yvette was 2 years and 11 months old. The different steps of the assessment model will be discussed as implemented for her.

As part of the **background information** the medical history and diagnosis showed that she had severe cerebral palsy as a result of perinatal pathology. There are no reports of seizure activity. She has severe quadriplegia, is nonambulatory and has no functional fine motor skills. She is fully dependent for all daily activities. A screening of Yvette's visual abilities and hearing acuity in both ears did not reveal any significant problems.
We also interviewed the parents to get information about Yvette's **communication partners:** important facilitators in Yvette's home environment were : both parents, all four grand-parents and the baby-sitter. Yvette visits the therapeutic nursery group in the rehabilitation centre three times a week for three hours. During these visits, she receives physiotherapy, occupational therapy and language therapy. Facilitators in the institution include the three staff members within the nursery group and her three therapists. Also the female taxi driver who was responsible for her transit to and from the centre was identified as a facilitator. All these people together formed the 'intervention group' for Yvette. The Netherlands is a small country where people live close to one other; therefore it is generally possible to reach all facilitators.
All identified facilitators completed a **questionnaire** which served to sensitize them to important aspects of their communication with Yvette. From these questionnaires we knew Yvette predominantly communicated by looking at objects, persons, and actions. She also used facial expression and some vocalisations. She had no communication aids. We found out that she liked to be with other people, whether they were intensively interacting with her or not; she hated to be alone. If she was alone, she protested by screaming. Most facilitators reported that Yvette was able to recognize photographs and pictures of familiar people and objects. This will be important in determining the modes she can use. As answer to the question about the experienced difficulties in their communication with Yvette nearly all facilitators

reported that they found it really problematic that Yvette was not able to express her intentions in a way that they could easily understand.

Figure 2

SUMMARY OF COMMUNICATIVE FUNCTIONS USED

Child: Yvette (CA 3;1)
Date: January 1991

FUNCTIONS	QUESTIONNAIRES	OBSERVATIONS		
		response	initiation	modes
1. Attention to partner	+ + + + + + + - + - + + +	+	+	eye gaze
2. Indication of interrupted activity	- + - - - - + - - + + - -	-		eye gaze, facial expression
3. Acceptance of object offered	+ + + + - + - + + + + + +	+		facial expression, eye gaze, trying to grasp
4. Turn taking within an activity	+ + + + - + + + - + + - -	±		eye gaze
5. Protest/rejection	+ + - - - - - - + + + + +	+	-	facial expression, vocalisation
6. Communication of choices	+ + - + - - - - + - + - +	±		eye gaze
7. Greeting/closing	+ + + + + - - - + + + + +	+	-	facial expression, eye gaze, gesture
8. Request for assistance	+ + - + - - - - + - + - -	-	-	
9. Request for object/action - within immediate environment	+ + - - - - - - + - + - -	±	±	eye gaze, vocalisation, gesture
- outside immediate environment	- - - - - - - - - - - - -	-	-	
10. Request for attention	+ + - + + + + - - + + + -	+	±	facial expression, vocalisation, eye gaze
11. Commenting on objects/actions/events - within immediate environment	+ + + + - + - - - + + - -	±	-	eye gaze
- outside immediate environment	- + + - - - - - - + + - -	-	-	

Legend:
Occurrence +
Non-occurrence -
Incidental occurrence ±

The most important conclusions at this point were that we knew Yvette was very communicative, although not successful in being accurately understood. The summary of communicative functions used by Yvette (as evaluated by the communication partners) is set out in Figure 2. From this figure it can be seen that the facilitators report different on the functions that Yvette expresses with them. This suggests that she has acquired some functions but does not use them in all environments; also possibly that some facilitators are not sensitive to certain functions. All facilitators were aware of the difficulties and more than willing to work at solutions.

In the **formal assessment**, the occupational therapist conducted a systematic observation of the functionality of different movements in different positions, but from a communication perspective. This confirmed that Yvette had no functional fine motor skills and could rely only on eye-gaze for communication. An important conclusion for communication was that she did have the potential to handle a one-switch button.
We assessed Yvette's cognitive level with Bayley's Developmental Scales and language comprehension with the Reynell Comprehension Scale. At the time of this assessment Yvette was 3 years and 1 month old. Her mental age was estimated at 16 months. This measurement has to be interpreted with caution because it is practically impossible to obtain reliable test results within the population of severely physically disabled nonspeaking children. Yvette's language comprehension level was estimated at 24 months.
With this information we knew at which age-level activities with the child could and should take place, and what should be regarded as appropriate language input.
Our own **observations** served to complete the information on Yvette's communicative functioning. We video-taped Yvette at home in a free-play context interacting with her mother and at the centre during several different activities. Referring back to Figure 2, the researchers' observations showed that four functions were well established in response to the partner's communication, for instance *protesting* or *greeting*. On the other hand she seldom initiated interaction. She only regularly expressed *attention to the partner* spontaneously.
Our observation confirmed that Yvette communicated by eye-gaze, facial expression and vocalizations.

Completing these assessment procedures took two months. Once this had been done all important daily communication partners of Yvette came together for two two-hour **instructional meetings**. Except for some of the centre personnel, the group had no prior experience with nonspeaking children using AAC techniques, therefore the first meeting was spent on providing general information. The summary of the communication assessment gave the facilitators an overview of the functions and modes Yvette used at that time. The assessment results were discussed, extensively illustrated with video-samples. This was the basis of an identification of the first **intervention goals**. The general goal of child intervention is the promotion of reciprocal turn taking patterns and symmetry in topic initiation. For Yvette the group agreed that *taking more initiatives in interaction* should be a priority for intervention, since it would enable Yvette to have more control over her daily

activities and interactions. As intervention targets the group chose two different communicative functions as initiatives. These were *request for assistance* and *request for attention from the communication partner*. The latter function was present to some extent but in a socially unacceptable form, that is screaming.
In the second two-hour meeting the intervention plan was further worked out. Firstly all facilitators received instruction about the general partner strategies to facilitate interaction as set out in the Appendix. For example the interpretation of eye-gaze for Yvette was important in order to follow the child's lead: all facilitators had problems in doing this correctly. The few examples where facilitators did use these strategies in the videotapes were used as illustration.
The results of the sensorimotor observation suggested that Yvette could use the following communication aids: a *see-through window* of plexi-glass which could be attached to the laptray of her wheelchair and a *communication book* as an extension of her available vocabulary and for situations where the window could not be used. Photographs, pictures, graphic symbols and small objects could be attached to the window and could be easily substituted. The communication book was filled with photographs, pictures, and graphic symbols initially using the same vocabulary as the window. Finally she should have a horn with an adapted one-switch button with which she could request attention of others. The proposal to develop these communication aids was discussed in the group and accepted.
Finally the group discussed natural contexts in which Yvette could use the targeted functions and the modes. For example: in a situation in which the mother was busy with household work and where Yvette wanted to request attention, she could use her horn.
After this second group meeting, the researchers formulated the **intervention plan** for each participant by specifying the support the partner should give Yvette. This consisted of a translation of the general facilitating strategies into concrete steps which should provide Yvette with opportunities to use the targeted functions. Figure 3 gives an example of an intervention plan for the function *request for attention*. It starts with:

> *1. If Yvette is sitting alone or playing on her own and you are doing other activities, ensure that Yvette's horn is positioned in a way that she can operate the switch easily.*

Each facilitator received an intervention plan for each targeted communicative function.
Now all facilitators tried to coach Yvette to participate in communicative interaction effectively and to express the targeted functions in the selected communication modes according to the plan.

Figure 3

Intervention Plan Child

Child: *Yvette*
Facilitator:
Date: *January 1991*

Intervention Goal: *Request for Attention: initiation*

	Opportunities/ facilitator	Modes of Communication	Content/Form Required
1.	*Shopping with mother*	*horn*	
2.	*While mother is doing household activities*	*horn*	
3.	*Walking outside*	*horn*	
4.	*When therapist is getting material for therapy session*	*horn*	

Support Required:

1. *If Yvette is sitting alone or playing on her own and you are doing other activities, ensure that Yvette's horn is positioned in a way that she can operate the switch easily.*
2. *When Yvette calls you with her horn, respond immediately by approaching her and giving her attention. Say something like "you called me, here I am!".*
3. *If Yvette tries to attract your attention by crying or squealing, move into her visual field at a distance, look at her with a clear questioning glance for a while, and then continue with your own activities.*
4. *If Yvette still has used her horn after ten seconds and is still crying or squealing, move again into her visual field, look from Yvette to her horn and back to Yvette again while pointing to the horn (modelling).*
5. *Look at Yvette in an expectant way and pause 10 seconds.*
6. *If Yvette still doesn't use the horn and continues to squeal, approach her and give her full physical assistance in using the horn. Say for example "You wanted to call me? You can use your horn and I will come to you straight away!"*
7. *If Yvette stops squealing without having used the horn, but doesn't protest any more, continue your own activities.*

Training of the facilitators took two approaches: individual training sessions and group meetings for instruction and evaluation every six months.
For example we had an individual training session with the mother in which we discussed a video sample of her interaction with Yvette. From our analysis we had observed that the mother talked too much, her pauses were too short and that she missed many eye-gazes from Yvette. Yvette had therefore few chances to communicate and, if she communicated using eye-gaze, her mother did not recognize the signals. To illustrate the changes we suggested in the mother's behaviour, such as longer pauses, we made an instruction video-tape with one of the research team and Yvette.
In Yvette's case the mother was involved in individual training sessions every two months, the teacher and teacher's assistant every three months, the therapists every six months and the other facilitators on request. After each session we made a written report for the individual concerned.
The **communication aids**, that is the plexi-glass window, book and horn, were developed. Vocabulary was chosen on the basis of the needs of the child. The communication book was constructed together with Yvette; she determined where the pictures should be placed.

Eight months after the introduction of the first intervention plans the whole group came together for an **evaluation of the intervention process**. On the basis of the repeated questionnaire and observations the child and facilitators were evaluated. For instance: none of the facilitators, at the start of the program, had been able to recognize the eye-gazes of Yvette as messages, they frequently did not see her eye-gazes. Now the mother was able to follow the child's lead via her interpretation of Yvette's eye-gaze. The other facilitators had also improved in seeing Yvette's use of eye-gaze but not enough to follow her lead in general. Again we took examples from the video-tape of successful interpretation for discussion and instruction in the meeting.
During this meeting the group agreed that Yvette had met the targeted goals in her use of modes and functions. If she wanted attention from a partner, she now used her horn instead of screaming. She requested for assistance by shifting her eye-gaze from the partner to the object with which she needed help, for example to the beaker she needed help to drink out of. But she also used the symbol TO HELP, since she had just started using Bliss-symbols.
On the basis of the follow-up assessment, the group decided to set a **new intervention goal** for the coming period. The group chose for the function *requesting objects/actions outside the immediate environment* using photographs and Bliss-symbols in the window and communication book.
Five months later the assessment steps were again repeated followed by an evaluation meeting. Again all facilitators agreed that Yvette had met the targeted goal. The new intervention goal was: *commenting on objects/actions/events outside the immediate environment*. In this way Yvette's communicative functions are continually being extended.

After one year we asked all facilitators to complete yet another questionnaire for an evaluation of the COCP Assessment-Intervention program. From their answers we know that all facilitators are very enthusiastic. They feel that they understand Yvette better and experience fewer problems in their communication with the child. The setting of goals together is seen as a very useful process. All those who were involved in individual training found the discussion of a video-sample of their communication with Yvette the most instructive part of the program.

At this moment we, the researchers, are almost finished with our intervention with Yvette. One of the language therapists in the centre has taken over the role of AAC-specialist for Yvette. Until the end of this year we will provide the training for all the language therapists and those responsible for special education in the rehabilitation centre in AAC and our specific program. The plan is that they will continue to implement it with all young nonspeaking children who come to the centre.

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Appendix

Strategies to Facilitate Communicative Interaction

(adapted from Light, McNaughton & Parnes, 1986)

1. *Structure the environment*
   Structure the physical environment and position the child to encourage and elicit communication. When you interact with the child, be sure that you are in his/her visual field. Face to face interaction is preferable. Make use of activities appropriate for the child's interest, age and skill level.

2. *Follow the child's lead*
   Attend carefully to the interests of the child within the environment (people, objects, activities) and acknowledge these interests. Respond to all attempts to initiate social interaction and to all the needs/requests communicated by the child.
3. *Solicit a shared focus*
   Keep your attention on the child from the moment the interaction starts and ignore interruptions from the environment unless you involve the child or conclude the interaction with the child appropriately. Attract the child's attention to an object, activity of person as necessary in the context. Don not force the child, but attract the child's attention in ways which are appropriate for the child and the situation. Try to wait for or to establish eye contact before you focus the child's attention on an object/person/activity.
4. *Provide opportunities for communicative interaction*
   Recognize and set up opportunities for the child to take turns in interaction with others (e.g., greetings, offering choices, or turn taking activities). Give the child a turn each time you have finished your own turn. Don't set up special exercises or training sequences for the child, but offer opportunities in natural occurring situations when you are already interacting with the child (playtime, daily care therapy session).
5. *Expect communication/interaction which is appropriate for the child*
   Show the child clearly that you expect communication. Expect communication about things which the child knows and understands and which is appropriate considering his/her physical status and communication skills.
6. *Pace the interaction (pause)*
   Interact at a pace which gives the child sufficient time to participate. Give the child sufficient time to respond to your own communication and to things that happen in the environment. Count till ten before you make a new attempt to elicit a reaction. Give the child also enough time to initiate interaction. Make sure that the child has finished his/her communication turn. Pause also after a child's turn: wait a few seconds before you take your turn.
7. *Provide models for the modes within the child's repertoire*
   Demonstrate to the child how he/she can communicate. Use modes of communication which the child could use expressively to participate in communicative interaction.
8. *Provide appropriate language input*
   Use language (speech, gestures/signs, graphic symbols) which the child is able to understand. Make sure that the child understands the topic you are communicating about (content). Don't use sentences which are too long or too many sentences in one turn (amount). Adapt the language form to the level of the child. Don't use complex sentences and be sure that the child can understand the communication mode. For example, don't use words, signs of graphic symbols if the meaning is not clear without contextual cues.
9. *Prompt*
   Encourage the child by appropriate verbal/nonverbal means (e.g., body posture, facial expression, speech, touching, pointing, gestures of actions) to take a turn when he/she has missed an opportunity to do so. Prompts should be as minimally intrusive as possible. If the child (after a long pause) doesn't respond to the prompt, increase the intrusiveness of your prompts step by step. Possible sequence of prompts (in order of intrusiveness): look expectant to the child, touch the child, make a question gesture, give cues for the way in which he/she could respond (look or point to the communication device or make a few signs which fit the situation), offer full physical assistance (make the sign together of point together to a graphic symbol).
10. *Reward all communicative attempts*
    Respond to all attempts of the child to communicate. React to the topics initiated by the child and take his/her reactions to your communication seriously.